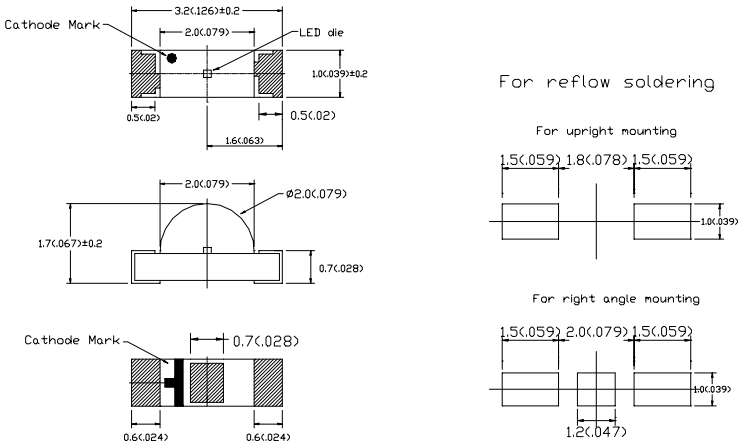
## ● Features:

1. Emitted Color : White
2. Mono-color type.
3. 3.2x1.0x1.7mm(1204) standard package
4. Suitable for all SMT assembly methods.
5. Compatible with infrared and vapor phase reflow solder process.
6. Compatible with automatic placement equipment.

## ● Applications:

1. Automotive : Dashboards, stop lamps, turn signals.
2. Backlighting : LCDs, Key pads advertising.
3. Status indicators : Comsumer & industrial electronics.
4. General use.

## ●Package Dimensions:




NOTES:
1.All dimensions are in millimeters (inches).
2.Tolerance is ± 0.10mm (0.004") unless otherwise specified.
3.Specifications are subject to change without notice.

## ● Absolute Maximum Ratings(Ta=25℃)

| Parameter | Symbol | Rating | Unit |
|---|---|---|---|
| Power Dissipation | Pd | 120 | mW |
| Forward Current | $I_F$ | 30 | mA |
| Peak Forward Current ＊1 | $I_{FP}$ | 100 | mA |
| Reverse Volage | $V_R$ | 5 | V |
| Operating Temperature | Topr | -25℃~80℃ | - |
| Storage Temperature | Tstg | -30℃~85℃ | - |
| Soldering Temperature | Tsol | See Page7 | - |

＊1 Condition for IFp is pulse of 1/10 duty and 0.1msec width.

## ● Electrical and optical characteristics(Ta=25℃)

| Parameter | Symbol | Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Forward Voltage | Vf | $I_F$=5mA | | 2.8 | 3.2 | V |
| Luminous Intensity | Iv | $I_F$=5mA | 28 | 50 | - | mcd |
| Reverse Current | $I_R$ | $V_R$=5V | - | - | 100 | μA |
| Chromaticity Coordinates | x | $I_F$=5mA | - | 0.30 | - | - |
| | y | $I_F$=5mA | - | 0.31 | - | - |
| Veiwing Angle | $2\theta_{1/2}$ | $I_F$=5mA | - | 105 | - | deg |

## ● Typical Electro-Optical Characteristics Curves

Fig.1 Relative intensity vs. wavelength

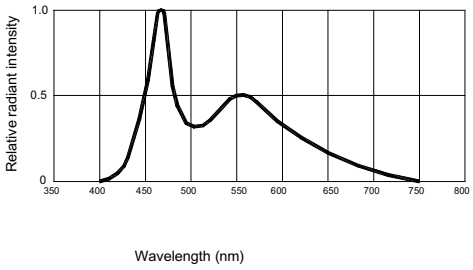



Fig.2 Forward current derating curve vs. ambient temperature

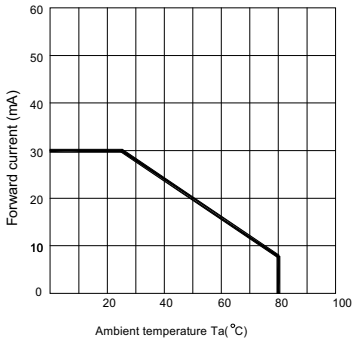



Fig.3 Forward current vs. forward voltage

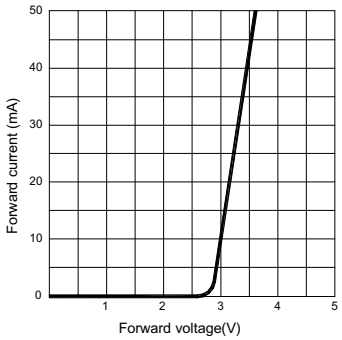



Fig.4 Relative luminous intensity vs. ambient temperature

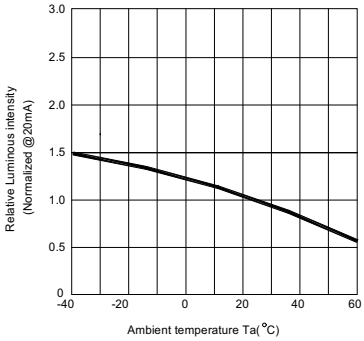



Fig.5 Relative luminous intensity vs. forward current

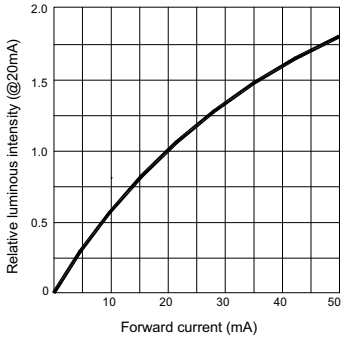
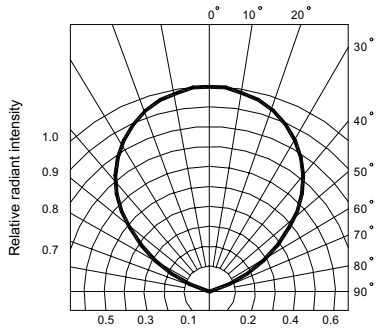
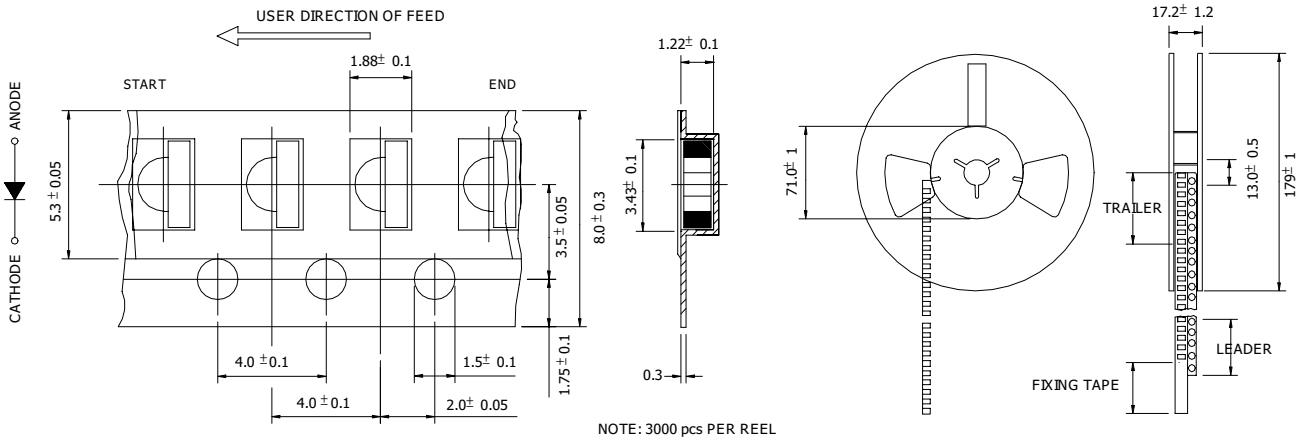


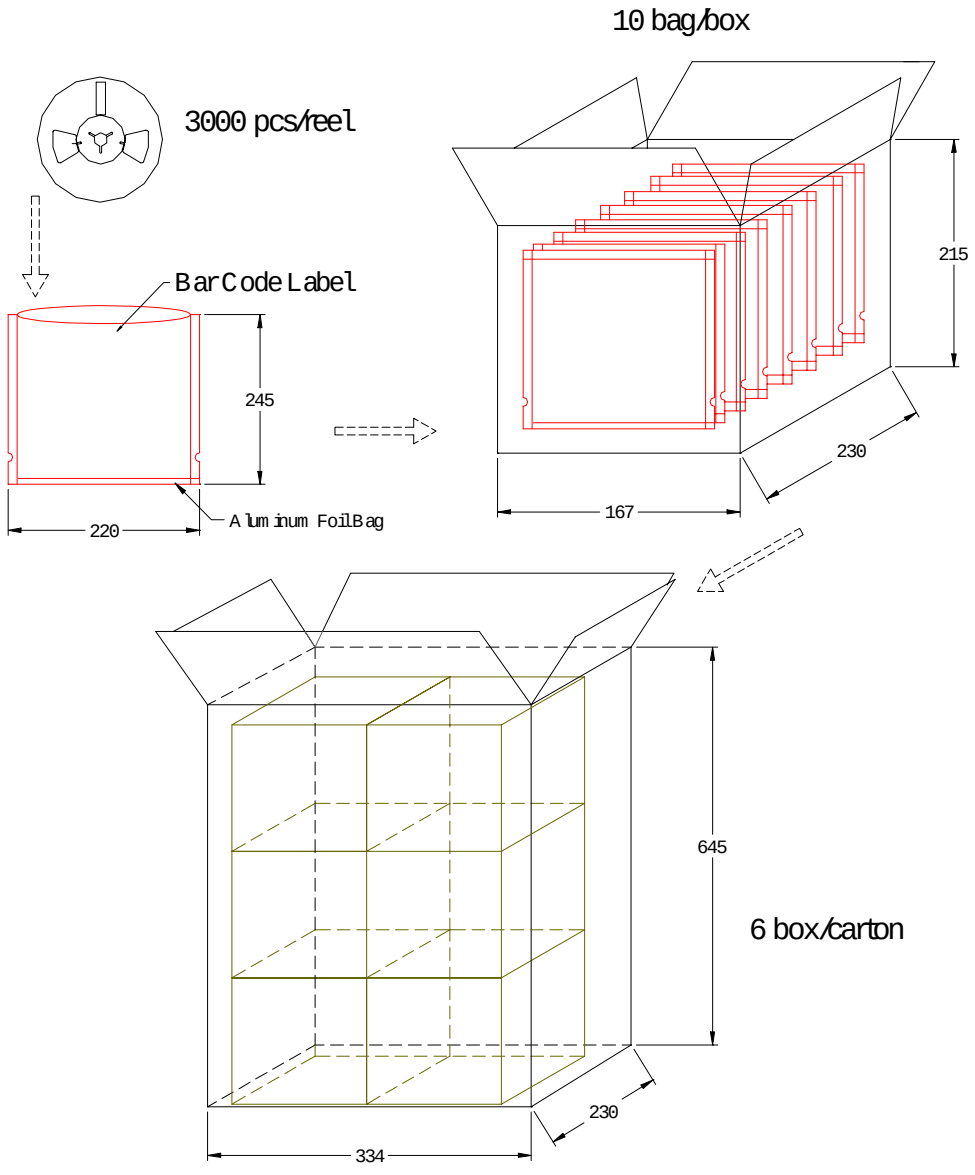

Fig.6 Radiation diagram



## ● Tapping and packaging specifications(Units: mm)




## ●Package Method:(unit:mm)



## ● Bin Limits

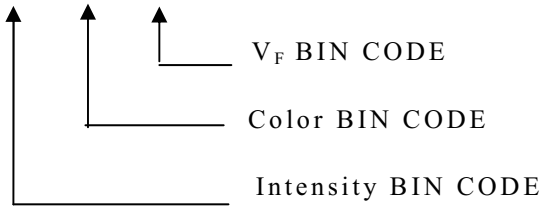
Intensity Bin Limits (At 5mA)

| BIN CODE | Min. (mcd) | Max. (mcd) |
|---|---|---|
| M | 24.0 | 48.0 |
| N | 37.0 | 72.0 |
| P | 55.0 | 110.0 |
| Q | 82.0 | 160.0 |

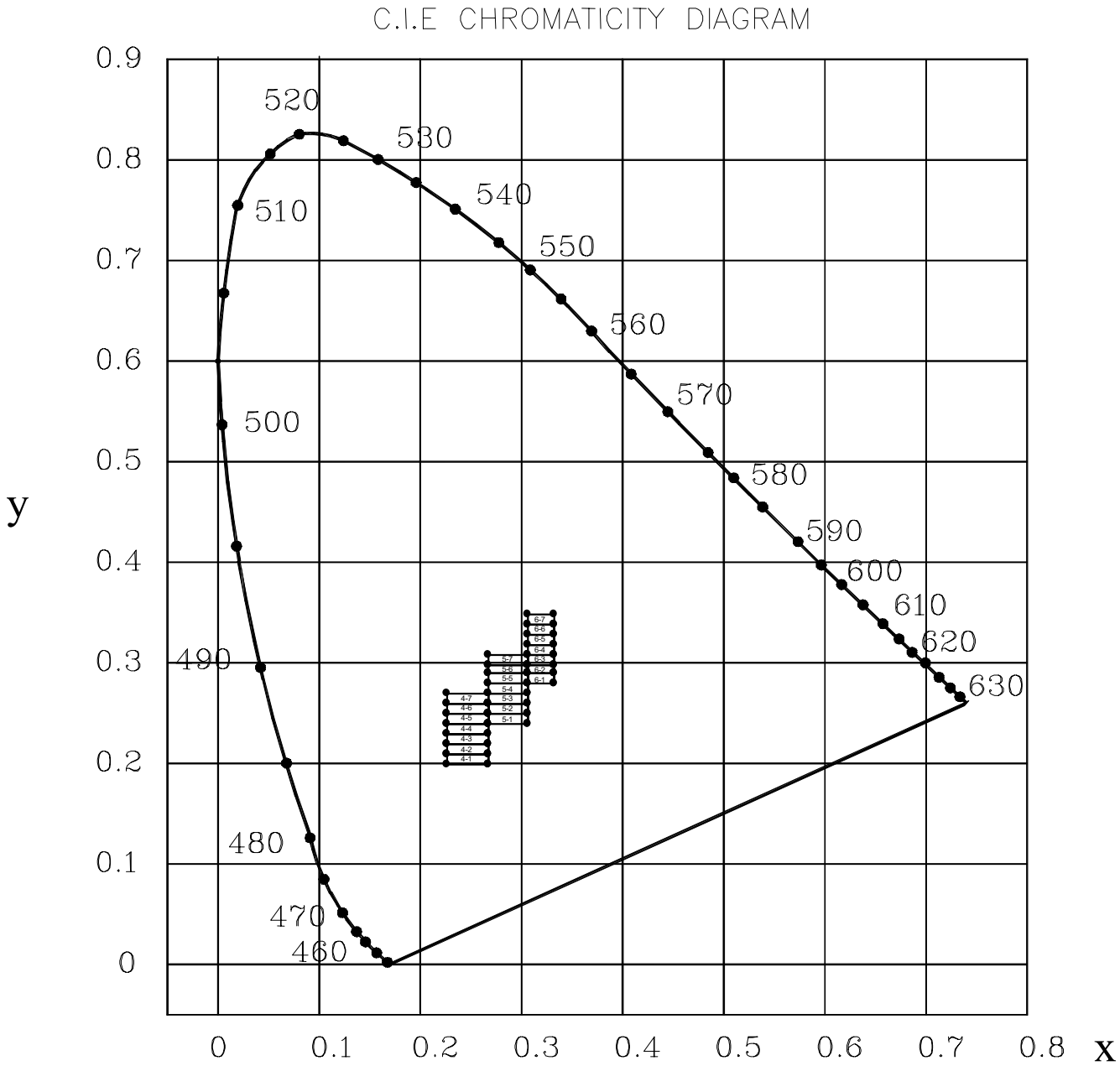
$V_F$ Bin Limits (At 5mA)

| BIN CODE | Min.(v) | Max.(v) |
|---|---|---|
| E | 2.35 | 2.65 |
| F | 2.55 | 2.82 |
| G | 2.75 | 3.05 |
| H | 2.95 | 3.25 |

● BIN : x x x



Color Bin Limits (At 5mA)



## Color Bin Limits (At 5mA)

| BIN | Chromaticity Coordinates | | | | |
|---|---|---|---|---|---|
| 4-1 | x | 0.265 | 0.225 | 0.225 | 0.265 |
| | y | 0.200 | 0.200 | 0.210 | 0.210 |
| 4-2 | x | 0.265 | 0.225 | 0.225 | 0.265 |
| | y | 0.210 | 0.210 | 0.220 | 0.220 |
| 4-3 | x | 0.265 | 0.225 | 0.225 | 0.265 |
| | y | 0.220 | 0.220 | 0.230 | 0.230 |
| 4-4 | x | 0.265 | 0.225 | 0.225 | 0.265 |
| | y | 0.230 | 0.230 | 0.240 | 0.240 |
| 4-5 | x | 0.265 | 0.225 | 0.225 | 0.265 |
| | y | 0.240 | 0.240 | 0.250 | 0.250 |
| 4-6 | x | 0.265 | 0.225 | 0.225 | 0.265 |
| | y | 0.250 | 0.250 | 0.260 | 0.260 |
| 4-7 | x | 0.265 | 0.225 | 0.225 | 0.265 |
| | y | 0.260 | 0.260 | 0.270 | 0.270 |
| 5-1 | x | 0.305 | 0.265 | 0.265 | 0.305 |
| | y | 0.240 | 0.240 | 0.250 | 0.250 |
| 5-2 | x | 0.305 | 0.265 | 0.265 | 0.305 |
| | y | 0.250 | 0.250 | 0.260 | 0.260 |
| 5-3 | x | 0.305 | 0.265 | 0.265 | 0.305 |
| | y | 0.260 | 0.260 | 0.270 | 0.270 |
| 5-4 | x | 0.305 | 0.265 | 0.265 | 0.305 |
| | y | 0.270 | 0.270 | 0.280 | 0.280 |
| 5-5 | x | 0.305 | 0.265 | 0.265 | 0.305 |
| | y | 0.280 | 0.280 | 0.290 | 0.290 |
| 5-6 | x | 0.305 | 0.265 | 0.265 | 0.305 |
| | y | 0.290 | 0.290 | 0.300 | 0.300 |
| 5-7 | x | 0.305 | 0.265 | 0.265 | 0.305 |
| | y | 0.300 | 0.300 | 0.310 | 0.310 |
| 6-1 | x | 0.330 | 0.305 | 0.305 | 0.330 |
| | y | 0.280 | 0.280 | 0.290 | 0.290 |
| 6-2 | x | 0.330 | 0.305 | 0.305 | 0.330 |
| | y | 0.290 | 0.290 | 0.300 | 0.300 |
| 6-3 | x | 0.330 | 0.305 | 0.305 | 0.330 |
| | y | 0.300 | 0.300 | 0.310 | 0.310 |
| 6-4 | x | 0.330 | 0.308 | 0.305 | 0.330 |
| | y | 0.310 | 0.310 | 0.320 | 0.320 |
| 6-5 | x | 0.330 | 0.305 | 0.305 | 0.330 |
| | y | 0.320 | 0.320 | 0.330 | 0.330 |
| 6-6 | x | 0.330 | 0.305 | 0.305 | 0.330 |
| | y | 0.330 | 0.330 | 0.340 | 0.340 |
| 6-7 | x | 0.330 | 0.305 | 0.305 | 0.330 |
| | y | 0.340 | 0.340 | 0.305 | 0.350 |

## ● Reliability Test

| Classification | Test Item | Reference Standard | Test Conditions | Result |
|---|---|---|---|---|
| Endurance Test | Operation Life | MIL-STD-750:1026<br>MIL-STD-883:1005<br>JIS-C-7021 :B-1 | Connect with a power If=20mA<br>Ta=Under room temperature<br>Test time=1,000hrs | 0/20 |
| | High Temperature High Humidity Storage | MIL-STD-202:103B<br>JIS-C-7021 :B-11 | Ta=+65℃±5℃<br>RH=90%-95%<br>Test time=240hrs | 0/20 |
| | High Temperature Storage | MIL-STD-883:1008<br>JIS-C-7021 :B-10 | High Ta=+85℃±5℃<br>Test time=1,000hrs | 0/20 |
| | Low Temperature Storage | JIS-C-7021 :B-12 | Low Ta=-35℃±5℃<br>Test time=1,000hrs | 0/20 |
| Environmental Test | Temperature Cycling | MIL-STD-202:107D<br>MIL-STD-750:1051<br>MIL-STD-883:1010<br>JIS-C-7021 :A-4 | -35℃ ~ +25℃ ~ +85℃ ~ +25℃<br>60min 20min 60min 20min<br>Test Time=5cycle | 0/20 |
| | Thermal Shock | MIL-STD-202:107D<br>MIL-STD-750:1051<br>MIL-STD-883:1011 | -35℃±5℃ ~+85℃±5℃<br>20min 20min<br>Test Time=10cycle | 0/20 |
| | Solder Resistance | MIL-STD-202:201A<br>MIL-STD-750:2031<br>JIS-C-7021 :A-1 | Preheating：<br>140℃-160℃,within 2 minutes.<br>Operation heating：<br>235℃(Max.), within 10seconds. (Max.) | 0/20 |

## ● Judgment criteria of failure for the reliability

| Measuring items | Symbol | Measuring conditions | Judgement criteria for failure |
|---|---|---|---|
| Forward voltage | $V_F$ ( V) | $I_F$=20mA | Over Ux1.2 |
| Reverse current | $I_R$(uA) | $V_R$=5V | Over Ux2 |
| Luminous intensity | Iv ( mcd ) | $I_F$=20mA | Below SX0.5 |

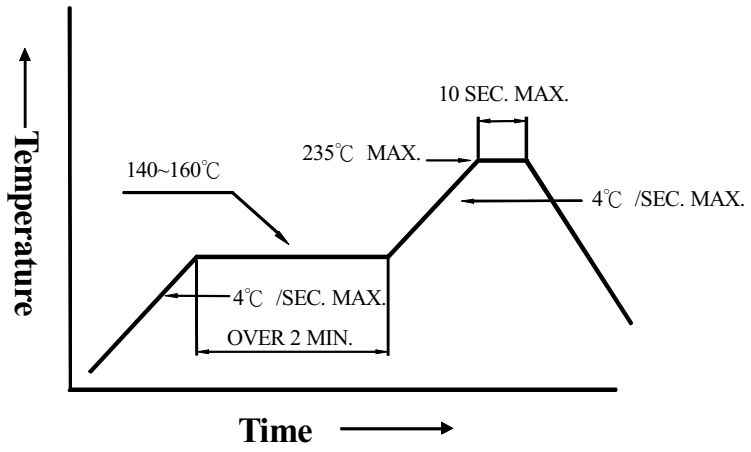
Note: 1.U means the upper limit of specified characteristics. S means initial value.

2.Measurment shall be taken between 2 hours and after the test pieces have been returned to normal ambient conditions after completion of each test.

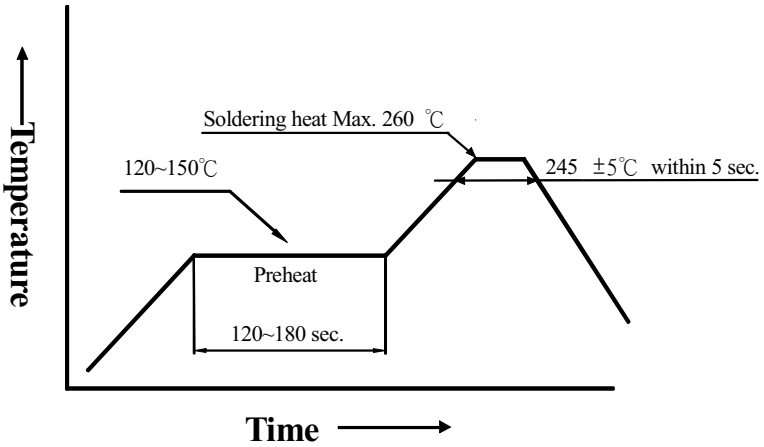
## ● Soldering :

1. Manual Of Soldering
   The temperature of the iron tip should not be higher than 300℃(572℉) and Soldering within 3 seconds per solder-land is to be observed.

2. Reflow Soldering
   Preheating : 140℃~160℃±5℃,within 2 minutes.
   Operation heating : 235℃(Max.) within 10 seconds.(Max)
   Gradual Cooling (Avoid quenching).




3. DIP soldering (Wave Soldering) :
   Preheating : 120℃~150℃,within 120~180 sec.
   Operation heating : 245℃ ±5℃ within 5 sec.260℃ (Max)
   Gradual Cooling (Avoid quenching).




## ● Handling :

Care must be taken not to cause to the epoxy resin portion of BRIGHT LEDs while it is exposed to high temperature.
Care must be taken not rub the epoxy resin portion of BRIGHT LEDs with hard or sharp article such as the sand blast and the metal hook.