## Features

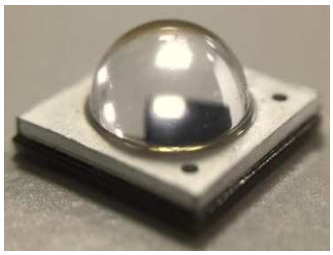
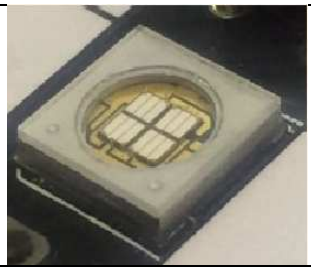
- 6868 UV LED
- ALN substrate with anti-UV Glasses Lens
- ROHS and REACH Compliant
- MSL 4 qualified according to J-STD 020
- ESD 8KV

## Applications

- UV Curing
- Medical applications
- Counterfeit Detection
- Purification

## Description

The IN-C68QA(X)TM UV series is a high-power(10W) UV LED with Good Thermal Dissipation and High Efficiency. It is a SMD type LED which can be used in various applications.

| | |
|---|---|
|  |  |
| IN-C68QABTM | IN-C68QACTM |
| 60D | 120D |
| 6.8*6.8*3.7mm | 6.8*6.8*1.5mm |

## Recommended Solder Pattern

(Suggest Stencil t=0.12 mm)

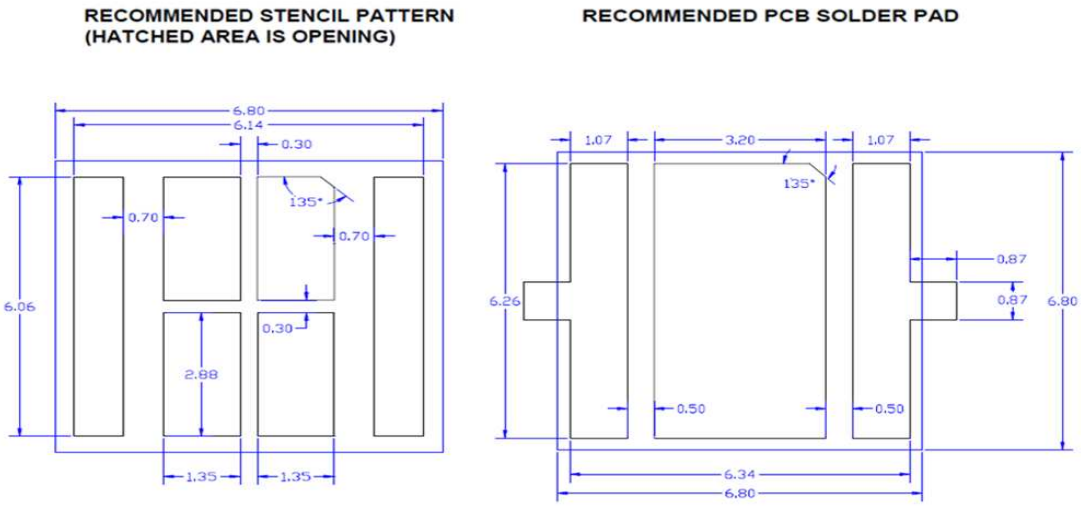



**Figure 1. IN-C68QABTM / IN-C68QACTM Recommended Solder Pattern**

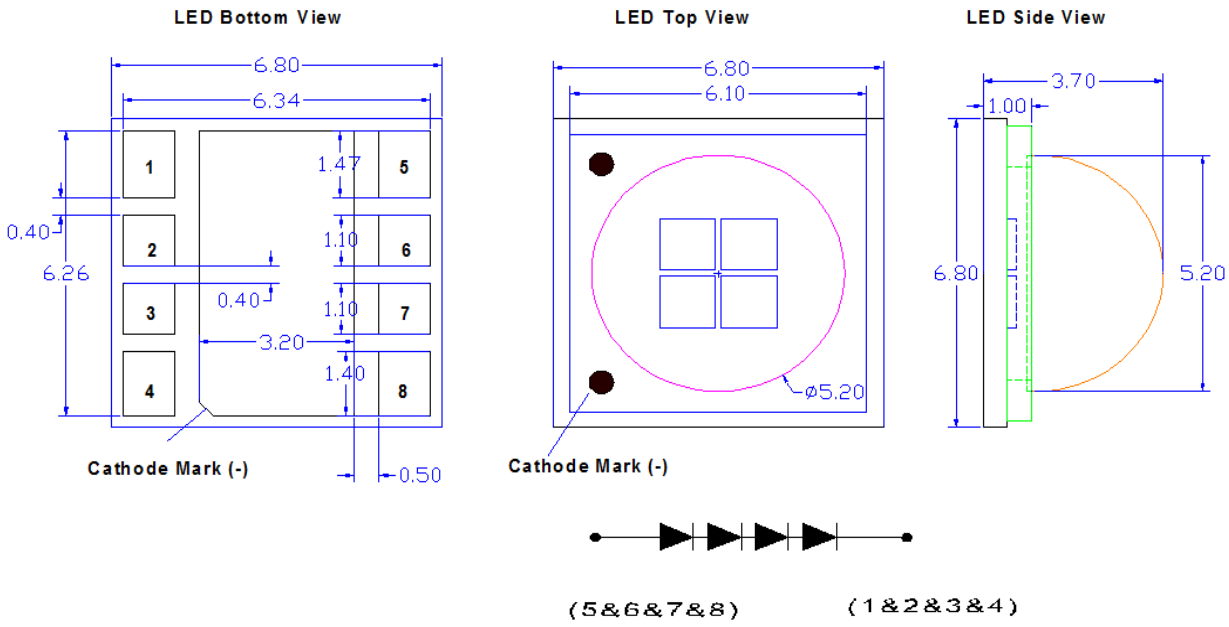
**Note:**

* All dimensions are in millimeters.

* Tolerance is ±0.13mm unless other specified.

# Package Dimensions

**60D**




**120D**

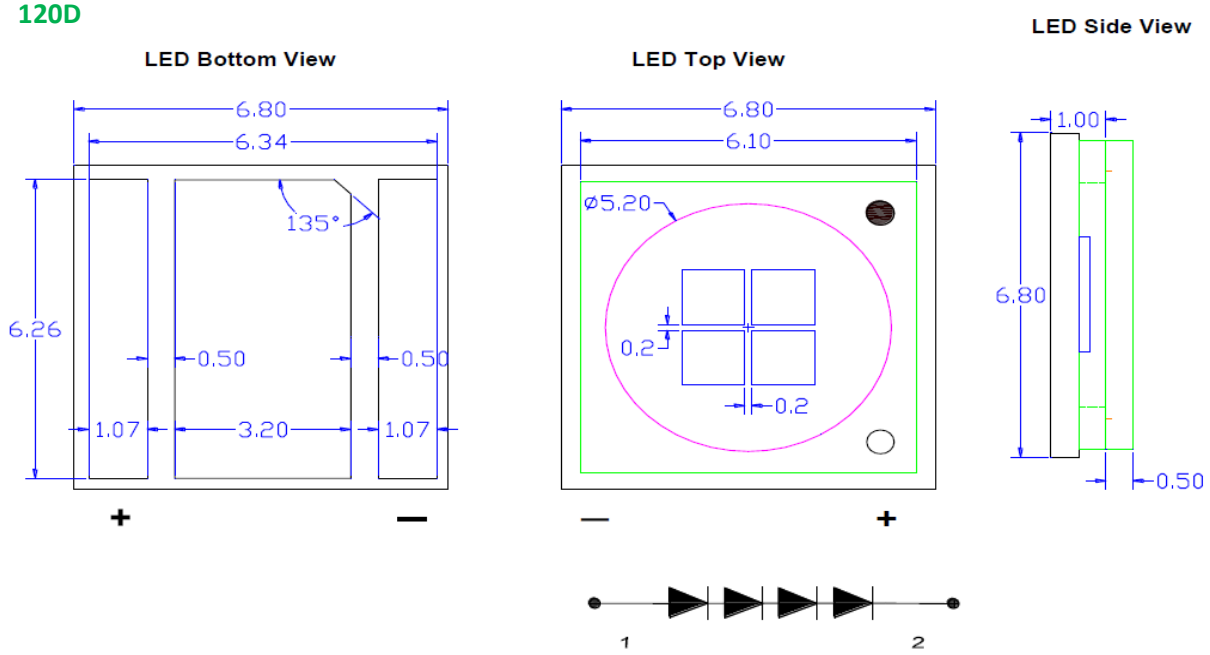



**Figure 2. IN-C68QABTM / IN-C68QACTM Package Dimension**

**Note:**

All dimensions are in millimeters.

Tolerance is ±0.13mm unless other specified.

## Absolute Maximum Rating at 25ºC

| Characteristics | Symbol | Min. | Typical | Max. | Unit |
|---|---|---|---|---|---|
| DC Forward Current[1] | $I_F$ | --- | 500 | 1000 | mA |
| Pulse Current (@1/10 duty) [2] | $I_P$ | --- | --- | 1200 | mA |
| Forward Voltage | $V_F$ | 12.0 | 14.0 | 16.8 | V |
| Reverse Voltage | $V_R$ | --- | -20 | --- | V |
| Leakage Current (5V) | $I_R$ | --- | --- | 10 | μA |
| Junction Temperature[3] | $T_j$ | --- | 85 | --- | ℃ |
| Operating Temperature Range | $T_{opr}$ | -40 | - | 80 | ℃ |
| Storage Temperature Range | $T_{stg}$ | -40 | --- | 80 | ℃ |
| Soldering Temperature | $T_{sol}$ | --- | --- | 260 | ℃ |
| Thermal Resistance Junction / Solder Point | $R_{th}$ | --- | 2.0 | --- | ℃/W |
| Viewing Angle[4] | $2\theta_{1/2}$ | --- | 60/120 | --- | Deg |
| Electrostatic Discharge (HBM) | ESD | --- | 8 | --- | KV |

**Notes:**

1. When operating at other than ambient temperature, maximum allowable current depends on derating curves.
2. Pulse width = 0.01s & duty factor = 1/10.
3. When operating at maximum allowable current, Tj must be below 85 ℃.
4. Viewing angle tolerance is ± 10°.

## Electrical Characteristics $T_A$ = 25℃ (Note 1)

| Product | $V_F$(V)@700mA | | | Viewing Angle | $I_R$(μA)@$V_R$=5V |
|---|---|---|---|---|---|
| | min | typ | max | $2\theta_{1/2}$ | max |
| IN-C68QABTM UV Series<br>IN-C68QACTM UV Series | 12.0 | --- | 16.8 | 60/120 | 10 |

**Notes:**

1. Performance guaranteed only under conditions listed in above tables.

## ESD Precaution

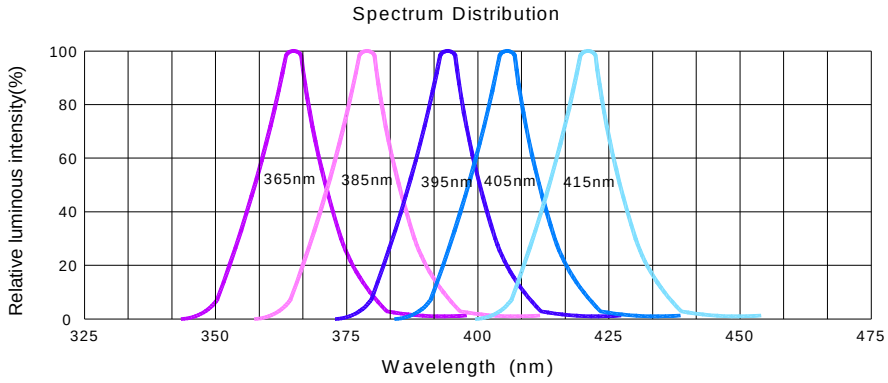
ATTENTION: Electrostatic Discharge (ESD) protection

The symbol above denotes that ESD precaution is needed. ESD protection for GaP and AlGaAs based chips is necessary even though they are relatively safe in the presence of low static-electric discharge. Parts built with AlInGaP, GaN, or/and InGaN based chips are STATIC SENSITIVE devices. ESD precaution must be taken during design and assembly.
If manual work or processing is needed, please ensure the device is adequately protected from ESD during the process.

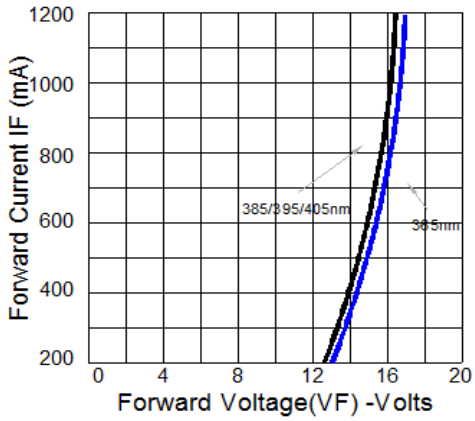
Please be advised that normal static precautions should be taken in the handling and assembly of this device to prevent damage or degradation which may be induced by electrostatic discharge (ESD).

## Electronic-Optical Characteristics

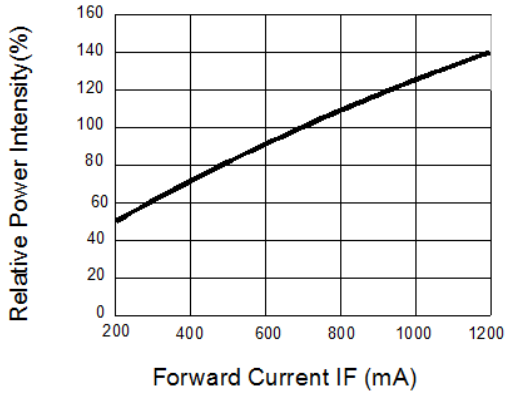
### Relative Spectral Power Distribution



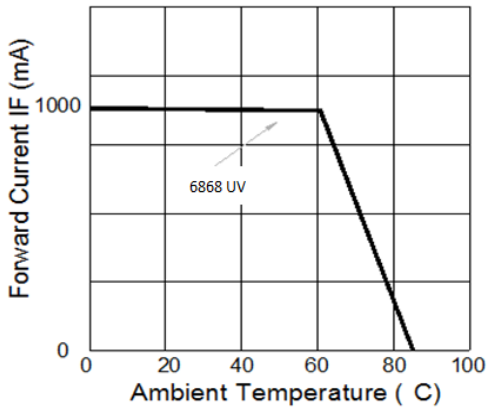

### Forward Current vs. Forward Voltage (Ta=25℃)



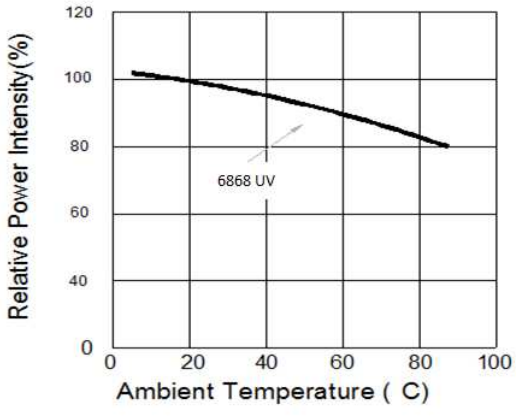

### Relative Radiant Flux vs. Forward Current (Ta=25℃)




### Forward Current vs. Ambient Temperature



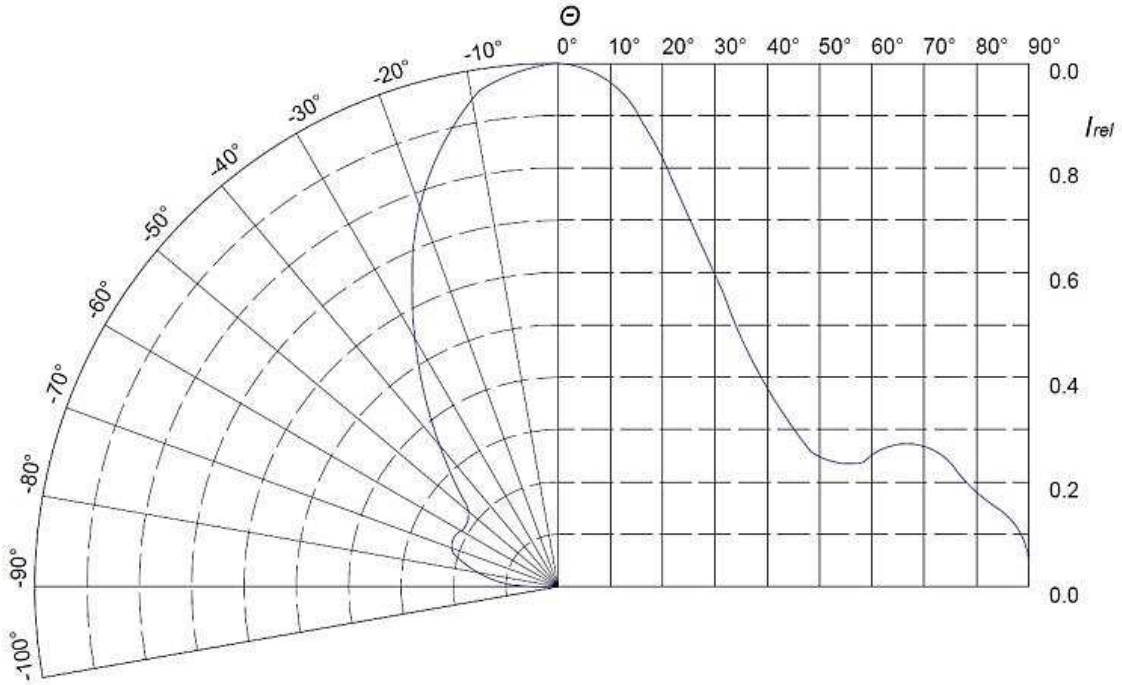

### Radiant Power vs. Ambient Temperature



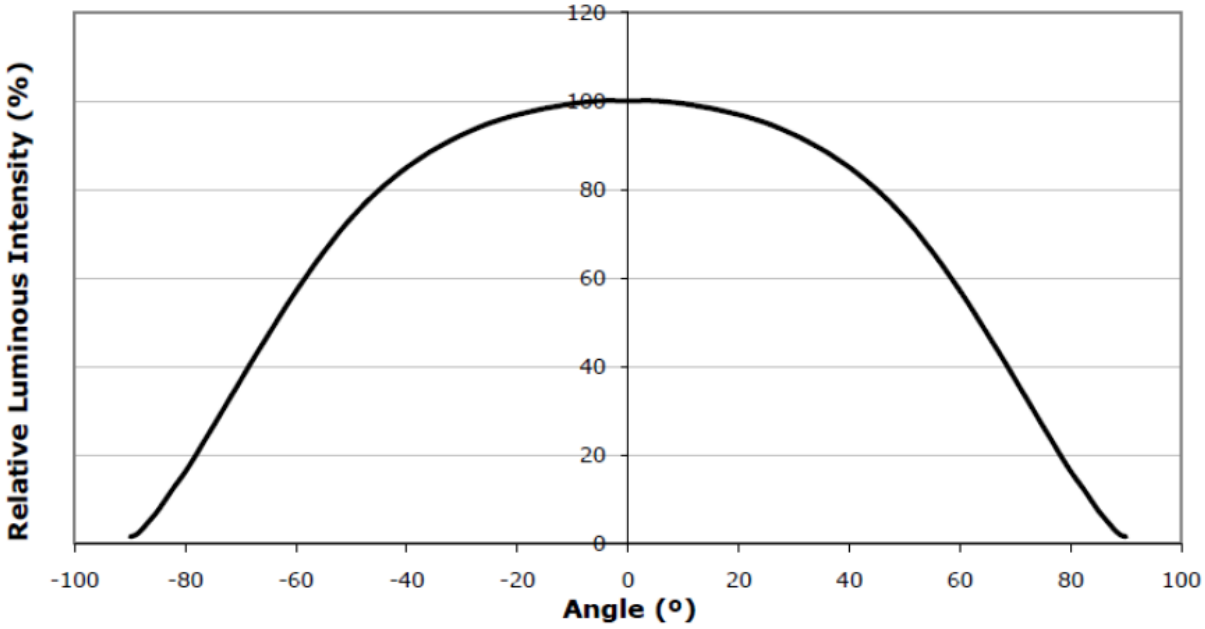

**Notes:**

Viewing angle(2θ1/2) ± 10°

## Typical Spatial Distribution(60D)



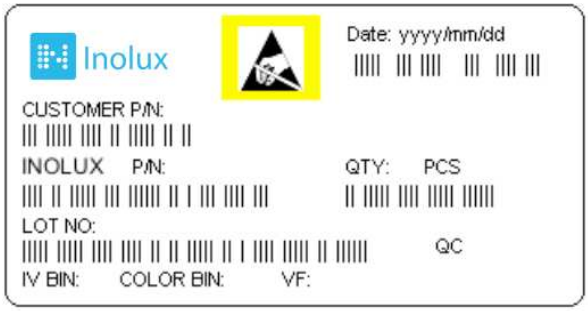

## Typical Spatial Distribution(120D)



## Ordering Information

| Product | Emission Color | Viewing Angle | Orderable Part Number |
|---|---|---|---|
| IN-C68QA(X)TM | U2:365~370nm | 60° | IN-C68QABTMU2 |
| | | 120° | IN-C68QACTMU2 |
| | U4:380~390nm | 60° | IN-C68QABTMU4 |
| | | 120° | IN-C68QACTMU4 |
| | U5:390~400nm | 60° | IN-C68QABTMU5 |
| | | 120° | IN-C68QACTMU5 |

## Label Specifications




## Inolux P/N:

| I | N | - | C | 6 | 8 | Q | A | X | T | M | | X | - | X | X | X | X |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Material | Package | | Die Qty. | Circuit | View Angle | Orientation | Current | Lens | Color | | Customized Stamp-off | | | |
| Inolux SMD | | | C = Ceramic Type | • Package, 68 = 6.8 x 6.8 mm<br>• Q: 4 chips<br>• A: 4 series<br>• View Angle,<br>B: 60 Deg<br>C: 120 Deg | | | | | T = Top Mount | M = 700mA | (Blank) = Clear | U2 = 365-370nm<br>U4 = 380-390nm<br>U5 = 390-400nm | | | | | |

### Lot No.:

| Z | 2 | 0 | 1 | 7 | 01 | 24 | 001 |
|---|---|---|---|---|---|---|---|
| Internal Tracker | Year (2017, 2018, …..) | | | | Month | Date | Serial |

# Peak Wavelength Binning

| Peak Wavelength unit: nm@700mA | | | |
|---|---|---|---|
| Bin Code | | Min | Max |
| U2 | R1 | 365 | 370 |
| U4 | SA | 380 | 385 |
| | SB | 385 | 390 |
| U5 | TA | 390 | 395 |
| | TB | 395 | 400 |

**Notes:**

1. Binning current is 700mA
2. Wavelength tolerance ± 2nm

# Voltage Binning

| Voltage unit: V@700mA | | | |
|---|---|---|---|
| Peak Wavelength | Bin Code | Min | Max |
| U2: 365~400nm | C0 | 12.0 | 12.8 |
| | C1 | 12.8 | 13.6 |
| | C2 | 13.6 | 14.4 |
| | C3 | 14.4 | 15.2 |
| | C4 | 15.2 | 16.0 |
| | C5 | 16.0 | 16.8 |

**Notes:**

1. Binning current is 700mA
2. Voltage tolerance ± 0.8V

# Radiant flux (Power) binning

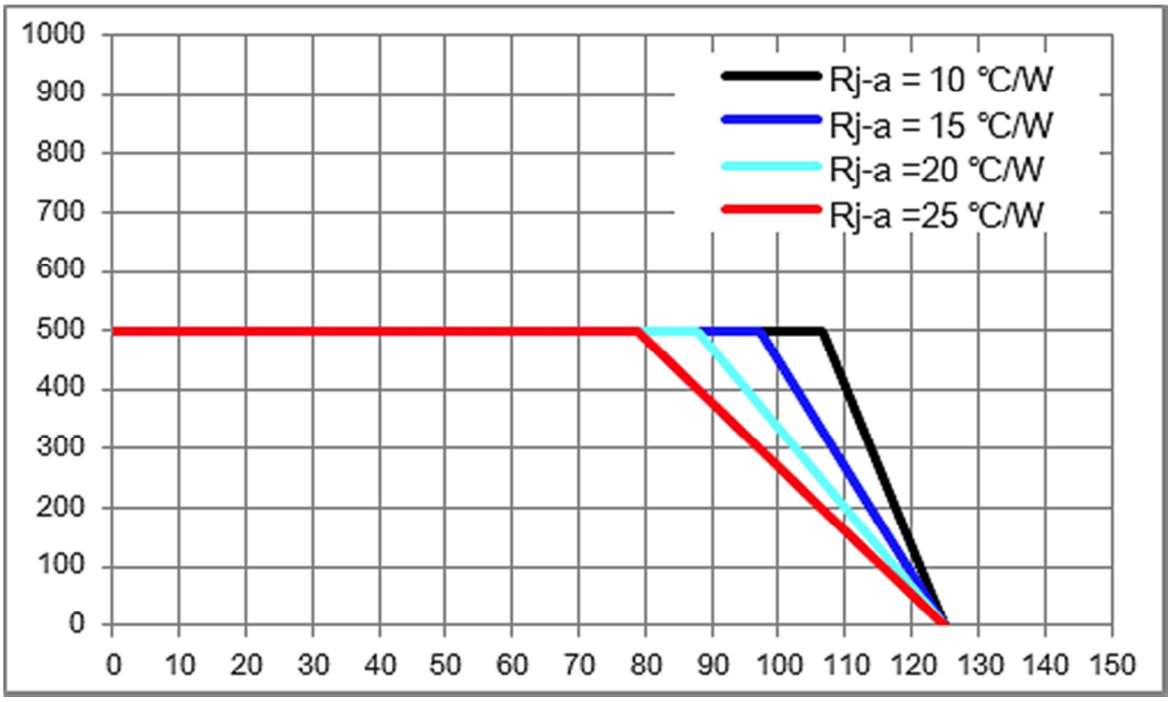
| | Radiant flux (Power) unit: mw@700mA | | |
|---|---|---|---|
| **Peak Wavelength** | **Bin Code** | **Min** | **Max** |
| **U2: 365~370nm** | P35 | 3,000 | 3,500 |
| | P40 | 3,500 | 4,000 |
| | P45 | 4,000 | 4,500 |
| | P50 | 4,500 | 5,000 |
| **U4: 380~390nm** | P50 | 4,500 | 5,000 |
| | P55 | 5,000 | 5,500 |
| | P60 | 5,500 | 6,000 |
| | P65 | 6,000 | 6,500 |
| **U5: 390~400nm** | P50 | 4,500 | 5,000 |
| | P55 | 5,000 | 5,500 |
| | P60 | 5,500 | 6,000 |
| | P65 | 6,000 | 6,500 |

**Notes:**

1. Tolerance of Forward voltage (VF ) ±0.8V
2. Tolerance of Radiometric Power (Po) ±10%
3. Tolerance of Wavelength ±2nm

## Thermal Design

Thermal design of the end product is important. The thermal resistance between the junction and the solder point (RΘJ-S) and the end product should be designed to minimize the thermal resistance from the solder point to ambient in order to optimize the emitter life and optical characteristics. The maximum operation current is determined by the plot of Allowable Forward Current vs. Ambient Temperature.




The junction temperature can be correlated to the thermal resistance between the junction and ambient (Rja) by the following equation.

Tj = Ta + Rja*W

Tj = LED junction temperature

Ta = Ambient temperature

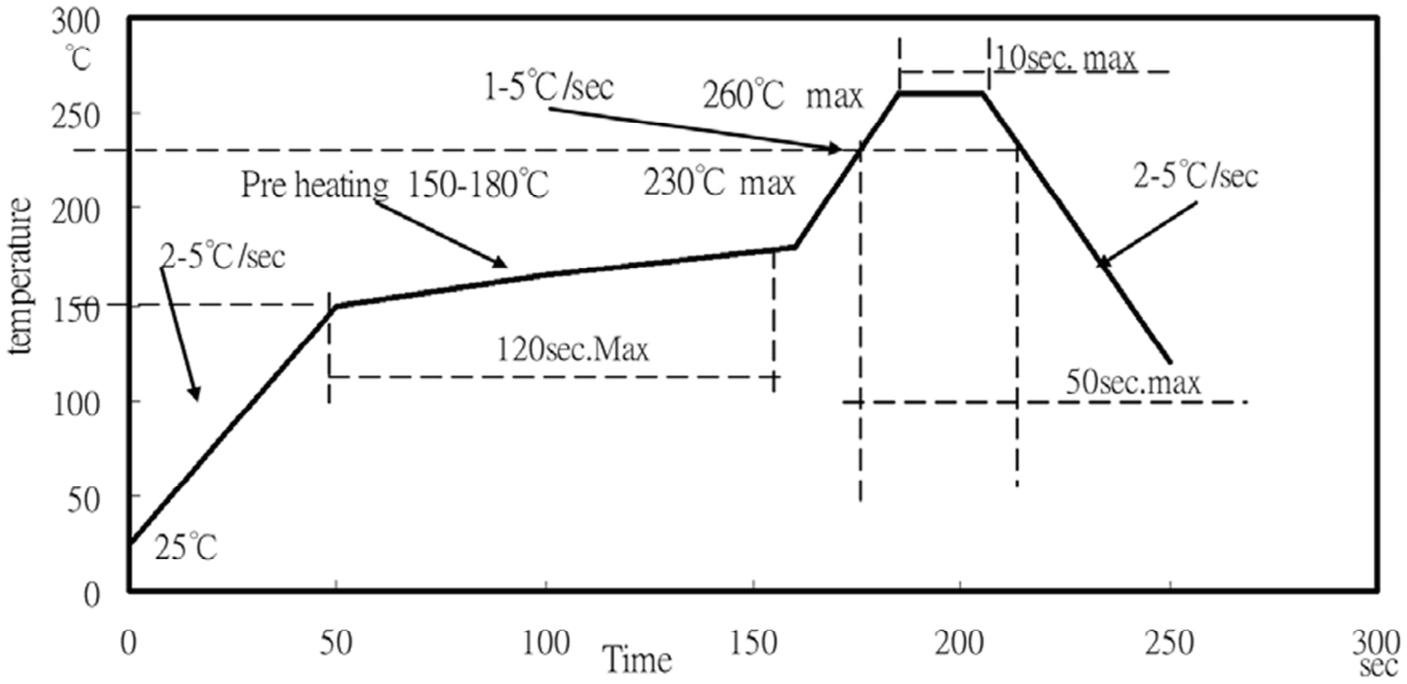
Rja= Thermal resistance between the junction and ambient

W = Input power ($I_F$*$V_F$)

## Reflow Soldering

The LEDs can be soldered using the parameter listed below. As a general guideline, the users are suggested to follow the recommended soldering profile provided by the manufacturer of the solder paste. Although the recommended soldering conditions are specified in the list, reflow soldering at the lowest possible temperature is preferred for the LEDs.

Suggested lead-free soldering profile:

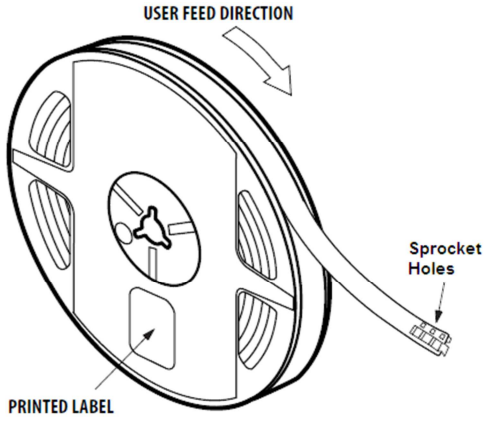


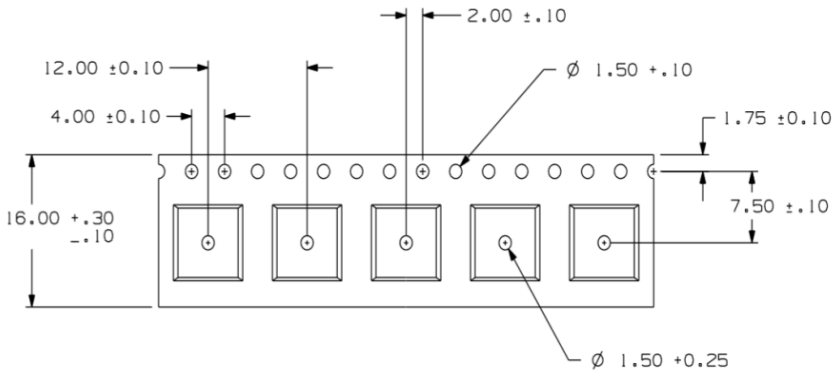

**Notes:**

1. The recommended reflow temperature is 240℃(±5℃). The maximum soldering temperature should be limited to 260℃.
2. Do not stress the silicone resin while it is exposed to high temperature.
3. The number of reflow process should not exceed 3 times.

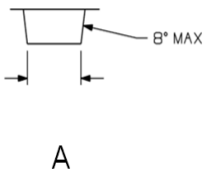
## Packing

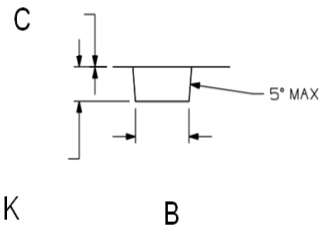
The carrier tape conforms to EIA-481D.

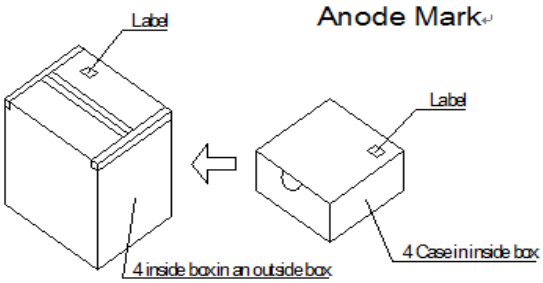



| Item | Dimension | Tolerance | Unit |
|---|---|---|---|
| A | 7.35 | ±0.10 | mm |
| B | 7.25 | ±0.10 | mm |
| C | 0.33 | ±0.02 | mm |
| D | 4.35 | ±0.10 | mm |




Notes:

1. Each Reel (minimum number of pieces is 100 and maximum is 350 packed in a moisture-proof bag along with 2 packs of desiccant and a humidity indicator card.
2. A maximum of 5 moisture-proof bags are packed in an inner box (size: 240mm x 200mm x 105mm ± 5mm).
3. A maximum of 4 inner boxes are put in an outer box (size: 410mm x 255mm x 230mm ±5mm).
4. Part No., Lot No., quantity should be indicated on the label of the moisture-proof bag and the cardboard box.

## Precautions

1. Recommendation for using LEDs

   1.1 The lens of LEDs should not be exposed to dust or debris. Excessive dust and debris may cause a drastic decrease in the luminosity.

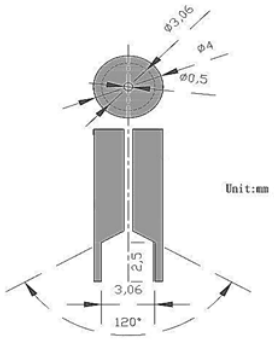
   1.2 Avoid mechanical stress on LED lens.

   1.3 Do not touch the LED lens surface. It would affect the optical performance of the LED due to the LED lens' damage.

   1.4 Pick & place tools are recommended for the remove of LEDs from the factory tape & reel packaging.

2. Pick & place nozzle

   The pickup tool was recommended and shown as below:




3. Lens handling

   Please follow the guideline to pick LEDs:

   3.1 Use tweezers to pick LEDs.

   3.2 Do not touch the lens by using tweezers.

   3.3 Do not touch lens with fingers.

   3.4 Do not apply more than 4N of force (400g) directly onto the lens.

4. Lens cleaning

   In the case which a small amount of dirt and dust particles remain on the lens surface, a suitable cleaning solution can be applied.

   4.1 Try gently wiping with a dust-free cloth.

   4.2 If needed, use a dust-free cloth and isopropyl alcohol to gently remove the dirt from the lens surface.

   4.3 Do not use other solvents as they may react with the LED assembly.

   4.4 Do not use ultrasonic cleaning which will damage the LEDs.

## Test Items and Results of Reliability

| Test Item | Test Conditions | Duration/ Cycle | Number of Damage | Reference |
|---|---|---|---|---|
| Thermal Shock | –40℃ 30min ↑↓5min 125 ℃ 30min | 100 cycles | 0/22 | AECQ101 |
| High Temperature Storage | Ta=100℃ | 1000 hrs | 0/22 | EIAJ ED-4701 200 201 |
| Humidity Heat Storage | Ta=85℃ RH=85% | 1000 hrs | 0/22 | EIAJ ED-4701 100 103 |
| Low Temperature Storage | Ta=-40℃ | 1000 hrs | 0/22 | EIAJ ED-4701 200 202 |
| Life Test | Ta=25℃ If=500mA | 1000 hrs | 0/22 | Tested with IN standard |
| High Humidity Heat Life Test | 85℃ RH=85% If=500mA | 1000 hrs | 0/22 | Tested with IN standard |
| High Temperature Life Test | Ta=85℃ | 1000 hrs | 0/22 | Tested with IN standard |
| ESD(HBM) | 8KV at 1.5kΩ;100pf | 3 Times | 0/22 | MIL-STD-883 |

| Criteria for Judging the Damage | | | | |
|---|---|---|---|---|
| Item | Symbol | Condition | Criteria for Judgment | |
| | | | Min | Max |
| Forward Voltage | VF | If=500mA | LSL ×0.9 | USL ×1.1 |
| Reverse Current | IR | VR =5V | - | 100μA |
| Luminous Intensity | Iv | If=500mA | LSL ×0.7 | USL ×1.2 |

Notes:

1. USL: Upper specification level
2. LSL: Lower specification level

## Revision History

| Changes since last revision | Page | Version No. | Revision Date |
|---|---|---|---|
| Initial Release | | 1.0 | 06-28-2018 |
| | | | |
| | | | |
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